

What is claimed

1. A charge detection device for use in an image sensor, said charge detection device including a vertical punch-through transistor having a source, drain and gate, said transistor having a gate surrounding its source and connected to it.
2. The device according to claim 1, wherein a charge present under the gate modulates the punch through potential barrier of the vertical charge-sensing punch-through transistor.
3. The device according to claim 2, including a charge reset means adjacent to and coupled to the vertical charge-sensing punch-through transistor to remove charge therefrom.
4. The device according to claim 3, wherein the charge reset means is a standard reset gate.
5. The device according to of claim 3, wherein the charge reset means is a resistive reset gate.

6. The device according to claim 3, wherein the charge reset means is a lateral punch-through transistor.

7. A CCD and CMOS device comprising:

an image sensor; and

a charge detection device in said image sensor including a vertical punch-through transistor having a source, drain and gate, said transistor having a gate surrounding its source and connected to it.

8. The device according to claim 7, wherein a charge present under the gate modulates the punch through potential barrier of the vertical charge-sensing punch-through transistor.

9. The device according to claim 8, including a charge reset means adjacent to and coupled to the vertical charge-sensing punch-through transistor to remove charge therefrom.

10. The device according to claim 8, wherein the charge reset means is a standard reset gate.

11. The device according to of claim 8, wherein the charge reset means is a resistive reset gate.

12. The device according to claim 8, wherein the charge reset means is a lateral punch-through transistor.